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Smoking.—One boy began to smoke at 3 years of age, 2 at 6, 2 at 7, 6 at 8, 8 at 9, 4 at 10, 4 at 11, 4 at 12, 2 at 13, 1 at 14, 1 at 17.

Dipping.—Two girls began to dip at 3 years of age, 1 at 4, 1 at 9, and 1 at 12. One of the children who began dipping at 3 years of age did so upon the advice of the family physician in order to "preserve her health." Similar cases are not very rare in the rural districts, and this girl came from the country.

Conclusion.

In the city of X, less than 1 per cent of the 2,215 white school children admit chewing tobacco and less than 1 per cent admit dipping snuff, while 3.25 per cent admit smoking. In all, 4.2 per cent admit the use of tobacco (chewing or smoking) or of snuff. Smoking and chewing were admitted only by boys, while more girls than boys admitted dipping snuff.

The use of tobacco was found to be more common among children from homes with inferior sanitation (privies) than among those from homes with better sanitation (sewer connection).

INDUSTRIAL HYGIENE.

A PLAN FOR EDUCATION IN THE AVOIDANCE OF OCCUPATIONAL DISEASES AND INJURIES.¹

By J. W. SCHERESCHEWSKY, Surgeon, United States Public Health Service.

It must be confessed that this subject is one to be approached in a spirit of diffidence for the reason that the results to be effected are so far-reaching and of such fundamental importance, the methods employed play such a leading part in the final result, and finally, the inauguration of any thorough plan of education will cost so much money, that the writer may well be excused for a tentative spirit in making suggestions.

There would hardly seem need for an extended discussion of the necessity for education in industrial hygiene and the avoidance of occupational complaints. There are approximately from 25,000,000 to 30,000,000 industrial workers in this country, all of whom are more or less exposed to health hazards. While many of these are the ordinary health hazards, present in the industrial as in any other sphere, on the other hand many of them are inherent to the occupation in question. There can be no question that the steady operation of these hazards exerts a deleterious influence upon the health of the individual, while many of them seriously menace life or curtail the period of productive activity.

¹ Read before the Section on Industrial Hygiene, American Public Health Association, Rochester, N. Y. September 7, 1915.

One of the most important results effected by the present "Safety First" campaign is that our eyes have been opened to the fact that it is not sufficient to make industries "Safe" from an accident standpoint; they should be "Safe" from a health standpoint as well. In other words, no industry ought per se to exert an injurious influence upon the health of the worker; in no industry should occupation therein entail curtailment of the period of economic activity.

While in the absence of reliable statistics we can only approximate the average yearly loss through the sickness of workers, figures which have been published in Europe enable us reasonably to conclude that the average annual loss through sickness, to workers in this country, is not far from eight to nine days. This would amount to some 600,000 years each year, or an economic loss of \$360,000,000 if average annual earnings are \$600. The loss due to premature physical decline or to reduction in productivity, the result of the continuous operation of industrial health hazards, can not as yet be estimated. This can be arrived at only as a result of future studies which are highly necessary.

A large part of the loss just adverted to is preventable and is due to lack of knowledge or to carelessness. It need hardly be said that the need for the conservation of human life and health was never more imperative than it is to-day. The gigantic destruction now going on daily in the vast conflict of European nations only emphasizes the urgency for methods of conservation of life and health. In addition to this, our attention is being repeatedly called to the alarming increase in the so-called "Diseases of degeneration." The conclusion seems inevitable that this increase can be due to nothing but the operation of modern conditions of civilization which have modified, more than in any other particular, the ways in which man gains his daily bread, i. e., industrial conditions.

Clearly there is need that something should be done. We all know, from the history of campaigns in the interest of the public health in the past, that education is one of our most effective means of improving health conditions. A more difficult question is the consideration of educational methods and the social groups to which this education should be directed. A short consideration will convince us that it will not be sufficient to educate workers alone. The field to be covered is more extensive. Not only must the worker be reached but educational measures must extend to the general public and to the medical profession.

Any plan for education must, therefore, be general in nature because of the close interdependence of all the units of society. Thus, the education of the medical profession is needed for the purpose of stimulating the interest in the study of diseases in relation to occupation, the improvement in collection of clinical data bearing upon:

occupational diseases, and the promotion of research work along those lines so that practical recommendations for advances in the sanitation of industries may result.

The education of the general public is required, first, because the history of all our constructive health legislation of the past shows that an enlightened public opinion is necessary to success, and, second, because it is impossible so to delimit the field of industrial hygiene as to separate it from the hygiene of the total environment. Moreover, employers of labor are an important class of the general public. Their cooperation is necessary if industrial health conditions are to be improved. Finally, the workers themselves are to be educated. In order to secure substantial improvement in the health conditions of industries, we must secure knowledge, on the part of the worker, of the general principles of industrial hygiene and the care of his own body. Otherwise provisions for his health and safety will, in the absence of his intelligent cooperation, be largely nullified.

Beginning with the medical profession, the recognized source of most of our hygienic information, it is only too plain that study of the relation of disease to occupation is regarded as a specialty and something with which neither the general practitioner nor the specialist in other fields is very closely concerned. Yet industrial workers constitute by far the largest class of medical patients. It is evident to anyone who examines the clinical records of the average hospital that with a wealth of material for study, with but rare exceptions, scant attention is paid, for the most part, to the relation of industrial health hazards and of occupational diseases to the morbid history of patients in such hospitals. Even the occupation of patients is imperfectly ascertained, the data on this point in most hospital histories being so vague and unreliable as to be practically valueless.

The influence of industries upon health is a subject which has been hitherto sadly neglected both in our medical curricula and at the bedside. There is therefore need to educate the medical profession to the importance of industrial hygienic measures and the study of the relation of occupations to diseases.

Inasmuch as hospitals are the chief sources of clinical material, and hence the natural locations where intensive studies of disease may be made, it is clear that here must begin the first steps in the education of the medical profession. As Hayhurst has pointed out, the first thing necessary to the utilization of hospitals as centers of education in industrial hygiene, is the adoption of a uniform nomenclature which will exactly designate the occupation of hospital patients. In taking histories, similar standards are required which will furnish information as to the previous industrial history of the patient and the relation, if any, of this to his previous or present morbid history. At all clinics for the instruction of medical students

stress should be laid upon these points by the demonstrator so that all such students may gain an idea of the important bearing of such data upon disease.

It is also important that death certificates should correctly and exactly indicate the occupation of the decedent. The instruction of the medical profession in this matter is primarily the function of the registrars of vital statistics. There is room for improvement in the form of death certificates themselves in that these should provide more fully for the accurate description of the occupation besides permitting the notation of previous occupations and the time during which each was pursued. Accurate information of this kind would be invaluable in the study of the mortality of occupations.

The increase in the interest of study of the relation of occupation to disease produced in medical centers of instruction by the measures thus roughly indicated, even if carried out in a relatively small number of hospitals, could hardly fail to produce an accumulation of valuable information.

This, together with the interest aroused in the general medical profession, would not only be productive of useful suggestions for intensive research and the improvement of the hygiene of industries, but the importance of the study of the relation of occupation to disease would also become so well recognized that thorough instruction in this subject would be part of the regular curricula of medical schools. One important result would be an increase in the number of physicians qualified to undertake the medical care and supervision of large industrial plants.

Turning to the question of the education of the general public and of workers, this will be considered under one head for the reason that the latter is but a subdivision of the former. All are in need of education in these particulars, the only difference being that in the case of workers, the education should be somewhat more specific to suit the occupation followed.

It is plain that, while we may leave, to a certain extent, at least, the education of the medical profession to centers of medical instruction, some of which are recognizing the importance of instruction of this character, the education of so vast a body as the general public must be the result of governmental cooperation, Federal, State, and municipal, allied with other civic agencies, such as associations formed for the betterment of industrial conditions and the trades unions of various industries.

Before any such cooperation can be effective to its fullest extent, there is certain preliminary work to be undertaken which, while it need not prevent the initiation of educational measures, will when completed add to their force and definiteness. By this preliminary work is meant the creation of uniform minimum standards of indus-

trial sanitation and legislation. Inasmuch as the Federal Government is recognized as the standard-making agency par excellence in this country, it would seem that the formulation of the standards referred to is peculiarly the work of Federal authorities.

The adoption of such standards, once they are formulated, is of course the work of the legislative authority of the several States. The adoption of such standards, while not interfering with any additional precautions States or municipalities may see fit to enforce or employers of labor or labor organizations voluntarily to adopt will at once give emphasis, clarity, and uniformity to an educational propaganda in that such standards necessarily define the scope of the information disseminated, increase its authority, limit the introduction of irrelevant material, and avoid the advocacy of conflicting measures in various parts of the country.

The history of the educational campaigns of the past—such as, for instance, the crusade against tuberculosis, the undue mortality of infants—and that of the present campaign for the prevention of industrial accidents furnishes us with a number of means by which information in regard to industrial hygiene and the avoidance of occupational complaints may be generally disseminated.

These summarized roughly are:

1. Permanent exhibits.
2. Traveling exhibits, including moving pictures.
3. Popular lectures.
4. Bulletins issued for popular distribution by Federal, State, and local health authorities, and by private associations.
5. Popular articles published by the press.
6. Instruction in public schools.

Permanent exhibits.—The museum of industrial hygiene is a powerful instrument for public education wherever located. Certain museums of industrial hygiene, located abroad, such as the one at Charlottenburg, for example, have aroused much popular interest, necessitating an increase in their funds and enlargement of floor space.

Steps should therefore be undertaken for the establishment of such museums in our important industrial centers. Such a museum is already located in New York City. Such museums should, in size and importance, be on a par with the magnificent museums of natural history common in our large cities, through which an interested throng of visitors is constantly passing. A sufficient number of such museums of industrial hygiene situated throughout the country would undoubtedly play an important part as centers for the dissemination of information in respect to industrial hygiene.

Traveling exhibits.—One need hardly point out the efficiency of the traveling exhibit in that it goes to the people rather than they

to it. As the material of such exhibits is naturally limited to the amount and dimensions required for easy transportation, much of the success of such exhibits depends upon the personality and training of the demonstrators who travel with it and the discrimination with which it is planned.

I know of no other way, however, by which such large numbers of persons may be reached and impressed in so short a time as by means of the traveling exhibit. Moreover, such traveling exhibits possess the further advantage that their subject material may be modified to meet the industrial conditions of the region through which they are traveling. In this way the special information needed in the premises is disseminated. As State health authorities very generally employ this method for educating the public in regard to other health matters, the use of such exhibits for educational purposes in industrial hygiene would be merely the extension of former activities.

Naturally, the moving picture forms a means for reaching an extensive audience which has been largely used in the past for educational purposes. In similar fashion, it constitutes an important and readily available means for popular education in industrial hygiene.

Popular lectures.—Many State and municipal health organizations now possess a staff of lecturers who deliver popular lectures upon health subjects. It can readily be seen that it is practicable to expand existing organizations to provide for the present necessity for popular instruction in industrial hygiene.

Popular articles and bulletins dealing with this subject are here passed over as their sphere and utility have become well defined through previous public health activities in other directions.

Instruction in public schools.—Provisions are made in the public schools of most States for the instruction of school children in hygiene. There is still a tendency on the part of the general public to take such instruction too lightly, or to regard it somewhat in the light of a fad. Yet all who have investigated this subject can not but be impressed with the fact that personal hygiene is the most important factor in maintaining the health and efficiency of the individual, due provision having been made to secure healthful places of employment.

In a recent investigation among the garment workers of New York City, made by the Public Health Service in 1914, neglect of the principles of personal hygiene, rather than insanitary working conditions, was found to play a principal part in the incidence of defects and diseases among these workers. Inasmuch as probably one-third of all school children will subsequently engage in industrial occupations, while the great majority of males in this country are employed, upon reaching manhood, it seems obvious that the proper time to equip the citizen with the hygienic knowledge necessary to enable him to care for his

body properly is not after he has entered a given occupation, but is an essential part of the training of the years of growth and development. Real knowledge of personal hygiene is quite as important for the citizen of the future as a knowledge of reading and writing. It would seem, therefore, particularly in connection with the vocational trend observable in the curricula of our most progressive public schools, that the courses of instruction in hygiene ought to be amplified and modified in such manner that the instruction in personal hygiene will be thoroughgoing and apply especially not only to the present but to the future maintenance of the body in health, after entrance into an occupation.

We must, therefore, consider the public school as an important instrument for improving the hygiene of workers of the future.

Considering immediate measures to be adopted for the education of the present generation of workers, it must be confessed that the outlook is not so hopeful as regards the expectation of results commensurate with the effort expended. No doubt we must await the advent of the succeeding generation for the full fruition of our educational measures. One would hardly expect busy workers of the present, intent upon other things, suddenly to acquire a lively sense of the importance of industrial hygiene and attention to the care of the body. A fortunate countervailing circumstance is the present campaign in the interests of industrial safety which has already prepared the ground, awakened the minds of the present day workers to the value of life and limb and set in motion a complicated machinery for education in the prevention of accidents.

The existing apparatus for the promotion of industrial safety should, in addition to the activities of Federal, State, and municipal health authorities, furnish a useful nucleus for the propagation of education in industrial hygiene and the avoidance of occupational complaints. Besides this we have the various labor organizations which should be enlisted in an educational movement for the improvement of the health of their members.

There remain the employers of labor. The concept is fast gaining ground among them that the individual is one of society's precious assets; that the condition of his health is not a matter of indifference, that it is poor social and business economy to subject workers to avoidable industrial hazards. As a consequence many employers are now beginning voluntarily to improve working conditions in their plants, supervise the health of their personnel, and attempt educational measures among them. The conservation of the health of workers and the improvement of conditions of employment, apart from purely humanitarian aspects, have been found to yield increased efficiency and economy in production, have fostered the spirit of

cooperation. The prediction may well be ventured, therefore, that employers will be found in a receptive attitude so far as educational measures are concerned.

What they will ask for, and rightly I believe, is precise information as to the improvements it is desired to effect and the practical means for carrying them out. It is here that the establishment of minimum hygienic standards will be especially valuable, as these constitute excellent guides.

There remains for discussion the agencies by which such an educational campaign may be put into operation. This campaign must be a cooperative enterprise. So far as the Federal Government is concerned, agencies already exist which can contribute their share. For instance, the Public Health Service is empowered by law to study the diseases of man and is conducting investigations in occupational diseases and the relation of occupations to disease. It stands ready to cooperate with State and municipal health authorities in the study of conditions of industrial hygiene in so far as its facilities permit. In some State and municipal health organizations provision is made for the study and the dissemination of information in regard to industrial hygiene and the prevention of occupational disease.

It needs, therefore, only an extension of agencies already in existence and cooperation in order to call into simultaneous being a number of centers making educational efforts. Boards of education can assist in a material way by improving and revising the methods of teaching hygiene in public schools so that such teaching will have a vocational trend—i. e., that it will fit our embryo citizens for their life's battle, with special reference to their future occupations.

Besides these strictly governmental agencies we have trades organizations and associations of private individuals, such as the National Safety Council, which can exert great educational influence among their members. As an example of such organizations may be cited the Joint Board of Sanitary Control of the Cloak, Suit, and Skirt and Dress and Waist Trades of New York City. This board, organized by mutual consent of the manufacturers and of the unions of these industries, has cognizance of the sanitary conditions in the workshops of the allied industries. Similar organizations in other industries might well wield great educational forces, which, cooperatively directed, should play an important part in the campaign for industrial health.

In conclusion it may be said that the need for an intensive campaign for education in industrial hygiene and the avoidance of occupational complaints is an actuality, and that agencies already exist by which such educational measures may be put into operation. What are mainly required are cooperation and the making of a beginning.